

The Invention Claimed Is:

1 1. A multiple access, spread-spectrum communication system for processing
2 a plurality of telecommunication information signals received simultaneously for
3 simultaneous transmission over a radio frequency (RF) channel as a code-division-
4 multiplexed (CDM) signal, the system comprising:

5 means for receiving a call request signal corresponding to a
6 telecommunication line information signal, and a user identification signal
7 identifying a user to which the call request and information signal are addressed;

8 a plurality of modem processing means, one of the plurality of modem
9 processing means providing a global pilot code signal, and each of the modem
10 processing means providing a respective message code signal and combining one of
11 the plurality of information signals with the respective message code signal to
12 provide a spread-spectrum processed message signal, the plurality of message code
13 signals of the plurality of modem processing means being synchronized to the
14 global pilot code signal;

15 assignment means responsive to a channel assignment signal for coupling the
16 information signals received on the telecommunication lines to respective indicated
17 ones of the plurality of modem means;

18 a system channel controller, coupled to a remote call-processing means and
19 responsive to the user identification signal, for providing the channel assignment
20 signal; and

21 an RF transmitter means, connected to each of the plurality of modem
22 processing means, for combining the plurality of spread-spectrum processed
23 message signals with the global pilot code signal to generate a CDM signal; for
24 modulating a carrier signal with the CDM signal and for transmitting the modulated
25 carrier signal through an RF communication channel.

1 2. A subscriber unit for a multiple access, spread-spectrum communication
2 system that receives and processes a code-division multiplexed (CDM) signal which
3 modulates a carrier signal in a radio frequency (RF) channel to reconstruct a
4 transmitted information signal assigned to a subscriber comprising:

5 receiving means for receiving the modulated carrier signal from the RF
6 channel and for demodulating the CDM signal from the carrier signal;

7 a subscriber unit controller;

8 modem processing means comprising:

9 a) global pilot code acquisition means comprising a global
10 pilot code generation means for providing a global pilot code signal;
11 a plurality of global pilot code-phase delayed correlation means for
12 correlating the global pilot code signal with the CDM signal to

13 produce a despread global pilot code signal, the code phase of the
14 global pilot signal being changed responsive to an acquisition signal;
15 and means for determining whether the despread global pilot signal is
16 present to produce an acquisition signal;

17 b) a plurality of message code generators which produce a
18 plurality of message code signals synchronized to the global pilot
19 code signal; and

20 c) global pilot code tracking means for producing an error
21 signal responsive to the acquisition signal;

22 d) means for adjusting the global pilot code signal in phase,
23 responsive to the error signal in a sense to produce the acquisition
24 signal which corresponds to an increased level of the despread global
25 pilot signal; and

26 e) a plurality of message signal acquisition means for
27 providing a plurality of despread receive message signals, each
28 acquisition means including a plurality of message signal correlators,
29 each message signal correlator correlating a respective one of the
30 message code signals with the CDM signal to produce a respective
31 despread receive message signal.

1 3. The subscriber unit of claim 2, wherein:

2 the signal from a radio frequency (RF) channel includes a user identification
3 signal and the call type signal each associated with the information signal and
4 assigned to a subscriber unit.

1 4. The subscriber unit of claim 3, wherein:

2 the despread message signals include the user identification signal and the
3 call type signal; and

4 the subscriber system controller is responsive to the user identification signal
5 to provide the call type signal for the received information signal and the despread
6 information signal to the local subscriber.

1 5. The multiple-access spread-spectrum communication system of Claim 1,
2 wherein the modem processing means further comprises:

3 a) code generation means comprising a generic pilot code means providing a
4 pilot code signal, and a message means for generating a plurality of message code
5 signals; and

6 b) spreading means coupled to the message means for combining each of the
7 information signals, user identification signals, and call type signals with a
8 respective one of the plurality of message code signals to generate a plurality of
9 spread-spectrum processed message signals.

1 6. The multiple access spread-spectrum communication system of Claim 5,
2 wherein:

3 the generic pilot code means provides a global pilot code signal, and the
4 message means is responsive to a timing signal which is synchronous with the
5 global pilot code signal, such that each of the plurality of message code signals of
6 the plurality of modem processing means is synchronous with the global pilot code
7 signal.

1 7. The multiple access spread-spectrum communication system of Claim 1,
2 wherein:

3 each of the plurality of information signals has several different channel
4 rates; and

5 each of the plurality of message code signals supports a pre-determined
6 information channel rate;

7 and the system further comprises:

8 remote call-processing means for providing a call type signal corresponding
9 to the information signal rate for each of the information signals; and

10 information channel mode modification means, connected to the system
11 channel controller and to the plurality of modem means and responsive to the call
12 type signal, for changing the combination of the information signals and the

13 respective message code signal to another pre-determined one of the message code
14 signals to support a different information channel rate for the message signal.

1 8. The subscriber unit of claim 2, wherein:

2 one of the despread receive message signals includes an information signal
3 and a message type signal corresponding to the information signal rate of one of the
4 information signals; and the subscriber unit further comprises:

5 information channel mode modification means responsive to the message
6 type signal received with the despread receive message signal for changing a
7 received information signal from a first message code to a second pre-determined
8 message code which second message code supports a different despread information
9 channel rate than the first message code; and

10 signal conversion means responsive to the message type signal for
11 selectively converting the despread information signal into a sampled data digital
12 signal.

1 9. A bearer channel modification system for a multiple access spread-
2 spectrum communication system including a plurality of information signals each
3 having several different channel rates which information signals are transmitted as a
4 plurality of message code channels over an Radio Frequency (RF) channel as a
5 Code Division Multiplexed (CDM) signal, the system comprising

6 means for providing a plurality of call type signals corresponding to the
7 information signal rates for the information signals; wherein each of the plurality of
8 message code channels supports a predetermined information channel rate;

9 a transmitter including a first information channel mode modification means
10 responsive to the call type signal for changing the combination of the information
11 signal from a first one of the message code signals to a second one of the message
12 code signals which second message code signal supports a different information
13 channel rate than the first message code signal; and

14 a receiver including a second information channel mode modification
15 means responsive to the call type signal for changing a received information signal
16 from the first message code signal to the second message code signal to support the
17 different information channel rate.

1 10. A bearer channel modification system according to claim 9 wherein the
2 transmitter further includes means for sequentially a) sending the message data
3 combined with the first message code signal to the substantial exclusion of the
4 second message code signal, b) concurrently sending the message data combined
5 with the first message code signal and the message data combined with the second
6 message code signal and c) sending the message data combined with the second
7 message code signal to the substantial exclusion of the first message code signal..

1 11. A bearer channel modification system according to claim 9 wherein the
2 transmitter further includes:

3 means for synchronizing the transmitter to a receiver on a sub-epoch
4 boundary;

5 means for sending the message signal combined with the first message code
6 signal prior to the sub-epoch boundary and for sending the message signal
7 combined with the second message code signal to the substantial exclusion of the
8 first message code signal subsequent to the sub-epoch boundary.

1 12. A multiple access spread-spectrum communication system for
2 dynamically changing the transmission rate of a plurality of information signals
3 received simultaneously over telecommunication lines by a base station and
4 transmitted to a subscriber through a plurality of spread-spectrum message
5 channels, the system comprising

6 a) a base station, connected to a remote call-processor which provides a call
7 type signal identifying an information signal rate of the respective information
8 signal and a conversion method for the respective information signal; comprising:

9 a system channel controller which assigns each of the
10 information signals and call type signals to a respective spread-
11 spectrum message channel;

12 first information channel mode modification means connected
13 to the system channel controller and responsive to the call type signal
14 for changing the combination of the respective information signal

15 from one spread-spectrum message channel to another pre-
16 determined spread-spectrum message channel which supports a
17 different information channel rate; and

18 b) a subscriber unit comprising:

19 a plurality of despreading means, each of the despreading
20 means for recovering a respective one of the information signals and
21 a respective one of the call type signals from a respective one of the
22 spread-spectrum message channels;

23 second information channel mode modification means
24 responsive to the call type signal for reassigning the despreading
25 means to another determined despreading means corresponding to a
26 different spread spectrum channel wherein a different information
27 signal rate is supported; and

28 a signal conversion means responsive to the call type signal
29 for selectively converting the despread information signal into a
30 digital data signal.

1 13. A method for capacity management in a spread-spectrum
2 communication system including a base station and a plurality of subscriber units
3 (SUs), wherein the base station transmits to the SUs a plurality of spread-spectrum
4 channels including an access channel having a traffic access value which is received

5 by each SU, and a respective plurality of message channels; and wherein each SU
6 transmits to the base station an assigned channel having a power alarm value and a
7 SU message channel, the method comprising the steps of:

8 measuring, by the base station, a transmit power level of the access channel
9 and the plurality of message channels;

10 comparing, by the base station, the transmit power level to a first
11 predetermined power value to produce a power comparison output value;

12 blocking transmission of an assigned channel and a respective SU message
13 channel, responsive to the power comparison output value, by setting the traffic
14 access value to a first predetermined value when the transmit power level is
15 equivalent to or greater than the predetermined value, wherein one SU of the
16 plurality of SUs, responsive to the traffic access value, does not transmit the
17 assigned channel and the SU message channel;

18 measuring, by each ones of the SUs, a transmit power level of the respective
19 SU for the respective assigned channel and message channel;

20 comparing by each ones of the SUs the transmit power level of the
21 respective SU to a second predetermined value; and

22 indicating a maximum power condition to the base station, by one SU, by
23 setting the respective power alarm value to an alarm condition value when the

24 transmit power level of the SU is equivalent to or greater than the second
25 predetermined value; and

26 blocking transmission of the respective assigned channel and SU message
27 channel of each ones of the SUs, by the base station responsive to the alarm
28 condition value, by setting the traffic access value to the first predetermined value.

1 14. A method for conserving capacity of an ISDN wireless link of a spread-
2 spectrum communication system including a first spread-spectrum transceiver and a
3 second spread-spectrum transceiver, said first spread-spectrum transceiver receiving
4 a digital data signal including a predetermined flag pattern corresponding to an idle
5 period and transferring the digital data signal to said second transceiver as a spread
6 spectrum signal, and said second spread-spectrum transceiver receiving the spread
7 spectrum signal and delivering the digital data signal, the method comprising the
8 steps of:

9 delaying, by the first transceiver, the digital data signal to form a delayed
10 digital data signal;

11 monitoring the digital data signal to detect the predetermined flag pattern;

12 transmitting the delayed digital data signal as the spread-spectrum signal to
13 the second transceiver;

14 suspending transmission of the delayed digital data signal when the flag
15 pattern is present;

- 16 detecting, by the second transceiver, the absence of the delayed digital data
17 signal; and
- 18 inserting the predetermined flag pattern in the delivered digital data signal.

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